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New or rare fungi from eastern Amazonia. 1. *Circinoconiopsis amazonica* gen. and sp. nov.

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Abstract — *Circinoconiopsis amazonica*, a new fungal genus and species, is described and illustrated from specimens collected during an excursion to the Scientific Station Ferreira Penna at the Floresta Nacional de Caxiuanã, eastern Amazonia, Pará, Brazil.

Key words — helicosporous microfungi, palm tree, systematics, tropical rainforest

Introduction

The helicosporous anamorphic fungi include a rather small group of fungi recognized for their peculiar coiled conidia. These may be coiled in one, two, or three planes. In some genera such as *Candelabrum* Beverw., *Helicofilia* Matsush., and *Spirosphaera* Beverw., bizarrely shaped conidia form after a very complicated coiling and branching process.

From the morphological and ecological point of view, the helicosporous microfungi are fascinating fungi that are mostly saprobes associated with plant litter, rotten wood, and decaying twigs in moist places or around water (Zhao et al. 2007).

In an impressive paper on helicosporous microfungi from China, Zhao et al. (2007) published a checklist including the fifty-four known genera of this group of fungi. Intensive studies of mycobiota, mainly in tropical regions, have led to the discovery of new taxa among these captivating fungi.

The dematiaceous anamorphic fungus that is the subject of this paper was collected on decaying material of *Oenocarpus* sp., a kind of palm tree. Its conidia closely resemble those of the monotypic genus *Circinoconis* Boedijn. Boedijn erected *Circinoconis* in 1942 based on specimens associated with *Flagellaria indica* L. (*Flagellariaceae*) in Sumatra, *Imperata arundinacea* Cirillo (*Poaceae*) in Malaysia, and *Plectocomia elongata* Mart. ex Blume (*Arecaceae*) in Java. For

many years no new *Circinoconis* records were published in any part of the world. During palynological studies of peat samples from Tripura, India, Prasad & Ramesh (1984) found dispersed conidia, which were radiocarbon dated at 3340 ± 140 Y.B.P. Comparing the fossil conidia with those of *C. paradoxa*, the authors concluded that "… spores dealt presently are not known to be borne by any other fungus, except *Circinoconis*." *Circinoconis* was found again, 67 years after the first record, on *Calamus* (*Arecaceae*) in Thailand by Pinnoi et al. (2009). The present fungus is sufficiently different to be proposed here as a new genus, *Circinoconiopsis.*

Materials & methods

During an excursion in October 2003 to the Scientific Station Ferreira Pena at the Floresta Nacional de Caxiuanã, eastern Amazonia, Pará, Brazil, (1°42.5′–2°15′S 51°15′–51°56′W) samples of decaying parts of palm trees were collected. Conidiophores and conidia were extracted from the substratum using a fine sharpen needle under the dissecting microscope and mounted in lactic acid in glycerol (Kirk et al. 2008). Microscopic observations were made under clear light compound microscope. Herbarium acronyms follow the Index Herbariorum (Holmgren & Holmgren 2012).

Taxonomy

Circinoconiopsis A. Hern.-Gut., **gen. nov.**

IndexFungorum IF 550073

Differs from *Circinoconis* in lacking trichotomous apical branching of conidiophores and in having conidiogenous cells that produce only one conidium each.

Type species: *Circinoconiopsis amazonica* A. Hern.-Gut.

Etymology: Latin, *circinoconi-* referring to the hyphomycete genus *Circinoconis* = resemblance; Greek, -opsis, (ὄψις).

Anamorphic. Conidiophores macronematous, mononematous, erect, rarely branched. Conidiogenous cells monoblastic, integrated, determinate. Conidial secession schizolytic. Conidia solitary, coiled in one or two planes, rostrate, dry.

Circinoconiopsis amazonica A. Hern.-Gut. **sp. nov.** Fig. 1

IndexFungorum IF 550072

Differs from *Circinoconis paradoxa* in lacking trichotomous apical branching of conidiophores, and in having conidiogenous cells that produce only one conidium each.

Type: Brazil, Pará, Melgaço, Caxiuanã, Scientific Station Ferreira Penna, on decaying leaves of *Oenocarpus* sp. (*Arecaceae*), 2. X. 2003, A. Hernández. (**Holotype,** MG-203121).

Etymology: the specific epithet refers to the Amazon forest, the place of collection.

Anamorphic fungus. Conidiophores in natural substratum effuse, hairy, originated from mycelium immersed in the substratum; macronematous,

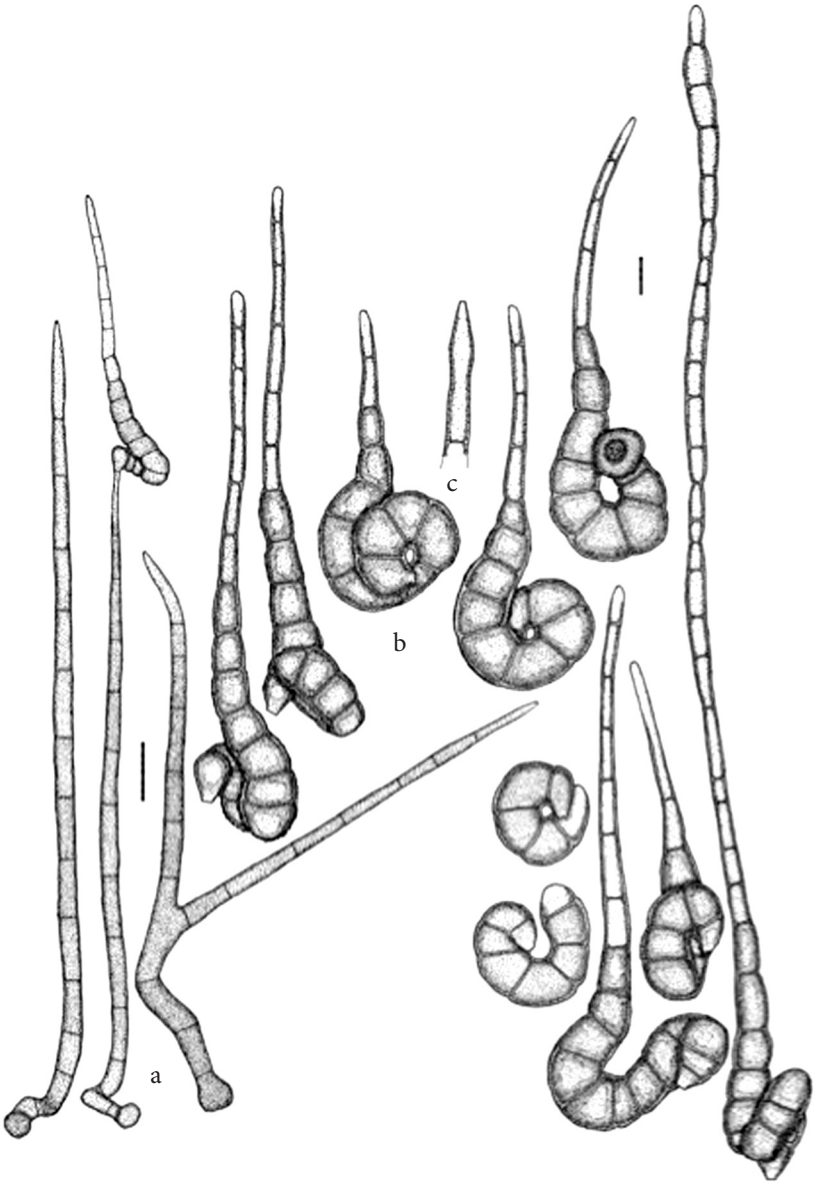

Fig. 1. *Circinoconiopsis amazonica* (holotype, MG-203121).
a: Conidiophores and conidium; b: Conidia; c: Detail of conidiogenous cell.
(Scale bars: a = 20 μm; b & c = 10 μm.)

mononematous, mainly unbranched, erect, 9–14-septate, smooth, brown to dark brown 114–273(–165.8) × 6–9(–7) µm. Conidiogenous Cells monoblastic, slightly lageniform to subulate, determinate 37–40 × 1.25–2 µm. Conidiogenous loci complanate, apical. Conidium Secession schizolytic. Conidia helicoid, 1–1½-coils, solitary, 84–150(–335) µm high, 28–39 µm wide in the coiled part, individual filaments 14–16 µm in the broadest part, 9–18 (– 34)-septate, rostrum 26–100(– 253) µm high, brown, paler towards the apex up to almost sub-hyaline, smooth, sometimes verrucose at basal part, dry. Teleomorph unknown.

Comments: The main differences between this new genus and *Circinoconis* lie in conidiophore morphology and pattern of conidiogenesis.

Circinoconis paradoxa Boedijn, the type and only species of that genus, bears conidiophores that are always trichotomously apically branched. The two lateral branches are fertile and light brown, while the central one is sterile and subhyaline. Fertile branches have integrated conidiogenous cells with percurrent proliferations (Ellis 1971). Conidia are racquet-shaped with a twisted dark brown basal part and a short to more or less rostrate paler apex. Conidiophores of *Circinoconiopsis* are, in comparison, mostly simple or rarely two-branched, but in that case the branching is neither apical nor trichotomous.

From the original description of *Circinoconis* the pattern of conidiogenesis is not clear. It was described thus: "… the development of the conidia starts with a more or less horizontally directed, nearly hyaline thread … which forms one coil and at the point of contact the cell walls are attached to each other, giving rise to a closed ring" (Boedijn 1942). Nothing was said about the conidiogenous cells or the mode of origin of conidia (for example, whether holoblastic or enteroblastic), nor about secession. Ellis (1971) provided more information, although it is not clear whether Ellis examined the type material (the only specimen in the collection where Ellis worked, IMI 45731a, was collected on *Imperata arundinacea* from Malaysia, but information for that number, added to the IMI accessions book on 31 May 1951, does not include date of collection or any indication that it might be part of the type). He described conidiogenous cells as "… monoblastic, integrated, terminating branches, percurrent, cylindrical" Although conidiogenous cells are illustrated by Ellis as annellidic, as a result of successive conidial production, the term annellidic was not used. Conidia, according to Ellis (1971), are circinate and rostrate; his illustration differs from that of Boedijn regarding conidial morphology and shows conidia that are not ringed. In *Circinoconiopsis*, by comparison, conidiogenous cells are determinate, acutely pointed, and sub-lageniform in shape.

Conidiogenesis in this new genus follows the holoblastic pattern, and no new conidia are produced after the conidium detaches. The conidiophore branching pattern differ absolutely in the two genera: in *Circinoconis* branches are always

present in apical position and are associated with conidial production, while in *Circinoconiopsis* branches are not always present and, when they occur, are neither apical nor related to the conidiogenesis process.

Regarding conidial shape, although in both genera conidia are circinate and rostrate, in *Circinoconis* only one coil is completed and a laterally protruding cell is observed just before the beginning of the beaked part, while in *Circinoconiopsis*, conidia are one to one and half coiled and the beaked part is narrower, ending in a longer and thinner rostrum than in *Circinoconis*. The conidial coil (40–60 μm) is wider in *Circinoconis* than in *Circinoconiopsis*.

These remarkable differences between these very close genera are, in the opinion of the author, enough to justify the establishment of a new genus.

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